

well **INFORMED**  
well **PROTECTED**  
well **AHEAD**



**TYPE 4**

**EN 14605:2005+A1:2009**  
**TYPE 4 PROTECTIVE CLOTHING**

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Performance requirements for clothing with spray-tight (Type 4) connections, including items providing protection to parts of the body only (Types PB\* [4])

\*Partial Body

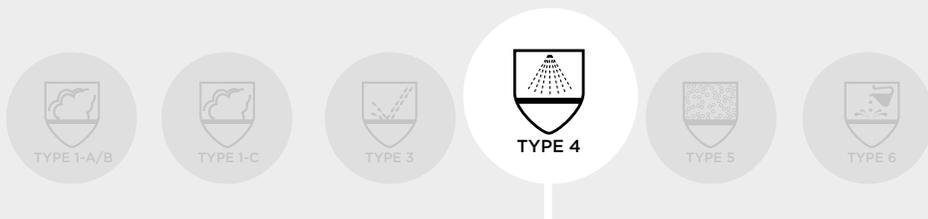
➤ To view other body protection standard guides, please visit [www.ansell.com/feelequipped](http://www.ansell.com/feelequipped) and click on the resources tab

**Ansell**

# GUIDE TO EUROPEAN NORMS

**To assist you with the selection of chemical protective clothing the EU has developed six categories for “types” of chemical protective clothing.**

Certification to a particular type offers an indication of your suit’s protection against a particular hazard (gas, liquid or dust). This guide explains performance requirements for protective clothing providing **protection to the full body against liquid chemicals (Type 4 clothing)**.



## **‘Type 4’ Protective Clothing Performance Requirements Includes:**

### **EN ISO 13688:2013 General Requirements\***

This standard sets out the general requirements for protective clothing, i.e. materials shall not be known to cause skin irritation or have any adverse effect to health. This also details garment sizing and labelling that is required.

**1**

### **Spray Test (High Level) - EN ISO 17491-4:2008 (Method B)**

Test methods for clothing providing protection against chemicals. Part 4: Determination of resistance to penetration by a spray of liquid (spray test)

**2**

### **Chemical Permeation Test**

Permeation is the process by which a hazardous chemical moves through a material on a molecular level.

**3**

### **Seams, Joins & Assemblages Test**

The Seam Strength of a coverall is required to meet the minimum performance class.

**4**

### **Material (Fabric) Test Requirements**

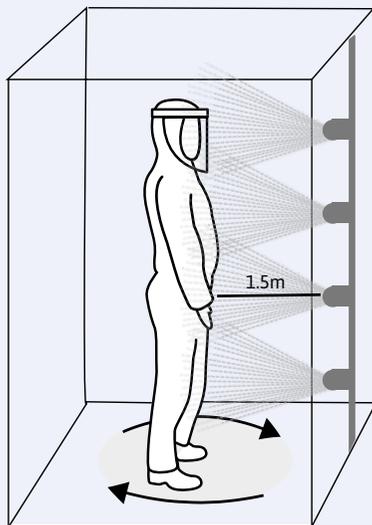
EN 14325:2004 comprises of a range of performance test methods which include: Abrasion, Flex Cracking, Trapezoidal Tear & Puncture Resistance.

\*EN 340:2003 was replaced with EN ISO 13688:2013. Although this change is not yet reflected in EN 14605, the required tests are essentially the same, and either reference is expected to be accepted by the notified body certifying the product.

# PROTECTIVE PERFORMANCE REQUIREMENTS

## 1 Spray Test - EN ISO 17491-4:2008

1. An aqueous **spray**, containing a fluorescent or visible dye tracer, is directed under controlled conditions at chemical protective clothing worn by a human test subject.
2. Inspection of the inside surface of the protective clothing and outside surface of absorbent clothing worn underneath allows any points of inward leakage to be identified.
3. The wearer then enters the chamber and stands on a rotating platform (the platform turns at 360°/min).
4. The suit is sprayed from all sides (saturated) by approx. 4-4.5 litres of the dyed water over the course of 1 minute (1 full rotation) from a series of spray nozzles of varying height.
5. There is a 1.5 metre gap between the spray nozzles and the test subject. The test subject performs a slow exaggerated walking action, raising their arms and legs throughout the test in order to expose all areas of the suit to the spray.

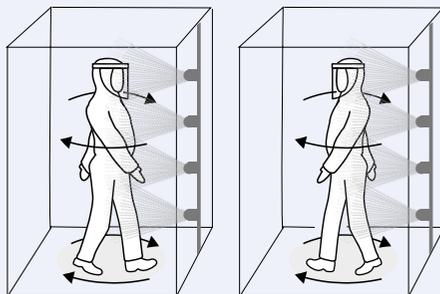


A spray of water containing fluorescent dye is sprayed onto the subject

3 bar pressure.

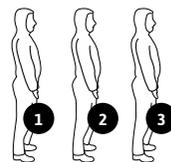
1.5 metre gap from nozzle to test suit.

The test subject performs a slow exaggerated walking action, raising their arms and legs throughout the test in order to expose all areas of the suit to the spray.



### Test Requirements

If any penetration is greater than 3 times the total calibration stain area, then the product has failed. The calibration stain is  $25 \pm 5 \mu\text{L}$  (microlitres) of liquid which gives an area of at least  $1 \text{ cm}^2$ . The test is repeated on 2 further suits – and all 3 suits must pass!



# PROTECTIVE PERFORMANCE REQUIREMENTS

## 2 Chemical Permeation - ISO 6529, EN 16523 and ASTM F739

Permeation is the process by which a hazardous chemical moves through a material on a molecular level. Molecules of chemical absorb into the outer surface of the material. They then diffuse across the material and are released or desorbed from the inner surface.

### Measuring Permeation

The resistance of a protective clothing fabric to permeation by a potentially hazardous chemical is determined by measuring the breakthrough time and the permeation rate of the chemical through the fabric.

### Permeation Test Methods

There are various permeation test methods in use today. Which one to use depends on a number of factors including the country of use for the protective clothing, and the type of chemical (i.e. gas or liquid).

The resistance of AlphaTec® clothing to permeation by a hazardous chemical is determined by measuring the breakthrough time and permeation rate of the chemical through the fabric. Permeation tests are carried out by independent, accredited laboratories in accordance with ISO 6529, EN 16523 and ASTM F739.

## Ansell **GUARDIAN**® PARTNER

Powerful NEW digital tool allows easy access to chemical permeation data for hazardous substances, including ASTM, EN and ISO standardised lists of challenge chemicals.

Our new digital solution is designed to simplify the selection of Ansell hand and body protection solutions. This tool offers an instant visual evaluation and an easy-to-use search functionality including the unique Chemical Abstracts Service (CAS) number system. For specific chemical protection challenges, an expert assessment is also available to provide a simplified set of choices, drawn from our broad portfolio of chemical protection solutions.

### Search

CAS	CHEMICAL NAME
110-82-7	CYCLOHEXANE



### Product selection

CHEMICAL PERMEATION DATA
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### Solution



➤ For up-to-the-minute chemical permeation data, please visit:  
[www.ansellguardianpartner.com](http://www.ansellguardianpartner.com)

# PHYSICAL PERFORMANCE REQUIREMENTS

## 3 Seams, Joins & Assemblages

Performance Requirement	Reference
Resistance to permeation of liquids (b)	EN 14325:2004, 4.11 (see below table)
Resistance to penetration by liquids (c)	EN ISO 17491-4 (Type 4)
Seam strength	EN 14325:2004, 5.5 – the test method specified is EN ISO 13935-2

Seams, joins and assemblages of Type PB [4] clothing shall be tested to the spray test (EN ISO 17491-4).

(b) Applicable only to seams which are exposed in use. For PB protection items only seams relevant to the construction shall be considered and a performance level of at least 1 shall be obtained.

(c) To be tested by whole suit tests, i.e. EN ISO 17491-4 (high level spray test) for Type 4 clothing\*

\* There is no mandatory requirement for EN ISO 6530:2005 chemical repellence and penetration tests on materials, seams, joins or assemblages for Type 4, as these products undergo harsher liquid testing already as outlined above.

## 4 Materials (Fabric) Test Requirements (Physical Test)

EN 14325:2004 comprises of a range of performance test methods. These are listed below;

Test Methods	Clause in EN 14325:2004	Minimum Performance Class
<b>Abrasion</b> (EN 530)	4.4	Class 1
<b>Flex Cracking</b> (EN ISO 7854 Method B)	4.5	Class 1
<b>Flex Cracking, -30°C</b> (EN ISO 7854) Note: -30 degree is not required, only optional	4.6 (a)	Class 1
<b>Trapezoidal Tear</b> (EN ISO 9073-4)	4.7	Class 1
<b>Tensile Strength</b> (EN ISO 13934-1)	4.9	Class 1
<b>Puncture Resistance</b> (EN 863)	4.10	Class 1
<b>Resistance to permeation by chemicals</b> (ISO 6529*)	4.11	Class 1

\* ISO 6529, previously also available as EN ISO 6529, has been used and is still widely used. It is foreseen to continue to be referenced in future revisions of clothing standards. EN 374-3 which has also been used frequently for testing of gloves and clothing is now replaced by EN 16523-1 and EN 16523-2. What standards are accepted for certification is up to the notified body but EN 374-3 may still be accepted one reason being that normally this method is carried out in a way that it falls within the specification of ISO 6529.

(a) Only applicable if clothing intended for use at very low temperatures.



**TYPE 4**

## **EN 14605:2005+A1:2009 TYPE 4 PROTECTIVE CLOTHING**

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### **LIMITED / SINGLE USE**

2000 Ts PLUS

2300 PLUS (MODEL 132)

2500 STANDARD

2500 PLUS

CFR (Type 3/4)

3000

4000

5000

### **RE-USABLE**

66-300 (MODEL 111 & 122)

66-310 (MODEL 111)

66-320 (MODEL 146)

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